جمهورية مصر العربية

وزارة التربية والتعليم
والتعليم الفني

نموذج إجابة
امتحان شهادة إتمام الدراسة الثانوية العامة
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المادة : التفاضل والتكامل (باللغة الانجليزية)

نموذج

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لكل مجموعة مقدر ومراجع

1-

(d) $f(-2)$ 1

2-

(c) $2x + c$ 1

3-

(a) $ln|\sin x| + c$ 1

4-

$\because\ y = 3e^x$

$\therefore\ \acute{y} = 3e^x$ $\frac{1}{2}$ $at\ x = -1,\ y = 3e^{-1}$ $\frac{1}{2}$ $\therefore\ slope\ of\ tangent = 3e^{-1} = \frac{3}{e}$ $\frac{1}{2}$

$\because$ the equation of the normal is : $y - y_1 = \frac{-1}{slope}(x - x_1)$ $\frac{1}{2}$

$\therefore\ y - 3e^{-1} = -\frac{e}{3}(x + 1)$ $\frac{1}{2}$

$\therefore\ y = \frac{3}{e} - \frac{ex}{3} - \frac{e}{3}$ $\frac{1}{2}$

5-

(a) $\frac{-\pi}{4}$ 1

6-

(c) $\frac{-1}{6}$ $\boxed{1}$

7-

$\because x \times y = \frac{z+1}{z-1} \times \frac{z-1}{z+1} = 1$ $\frac{1}{2}$

$\therefore y = \frac{1}{x}$

$y = x^{-1}$ $\frac{1}{2}$

$y' = -x^{-2}$

$y'' = 2x^{-3} \implies (1)$ $\frac{1}{2}$

At $z = zero \therefore x = -1 \implies (2)$

by Substitution in (1) $\frac{d^2y}{dx^2} = 2 \times (-1)^{-3} = -2$ $\frac{1}{2}$

Another Solution

$$\left.\begin{aligned} \frac{dx}{dz} &= \frac{z-1-z-1}{(z-1)^2} = \frac{-2}{(z-1)^2} \\ \frac{dy}{dz} &= \frac{z+1-z+1}{(z+1)^2} = \frac{2}{(z+1)^2} \end{aligned}\right\} \frac{1}{2}$$

$$\therefore \frac{dy}{dx} = \frac{-(z-1)^2}{(z+1)^2} \quad \frac{1}{2}$$

$$\frac{d^2y}{dx^2} = \frac{-2(z-1)(z+1)^2 - 2(z+1)(-(z-1)^2)}{(z+1)^4} \times \frac{(z-1)^2}{-2} \quad \frac{1}{2}$$

at $z = 0$ $\frac{d^2y}{dx^2} = \frac{(-2)(-1)(1) - (2)(1)(-1)}{1} \times \frac{1}{-2} = -2$ $\frac{1}{2}$

8-

$\because A = \pi r^2$ $\frac{1}{2}$

$\therefore \frac{dA}{dt} = 2\pi r \times \frac{dr}{dt}$ $\frac{1}{2}$

After 5 seconds $r = 4 \times 5 = 20\ cm$ $\frac{1}{2}$

$\therefore \frac{dA}{dt} = 2\pi \times 20 \times 4$

$= 160\ \pi\ cm^2/\text{sec}$ $\frac{1}{2}$

9-

(a) 4 $\quad$ 1

10-

(b) $-\frac{1}{4}$ $\quad$ 1

11-

(d) $\sqrt{2}$ $\quad$ 1

12-

(a)

The domain of the function is R.

$f(x) = (2-x)e^x$

$f'(x) = -e^x + (2-x)e^x$ $\frac{1}{2}$

$f'(x) = 0$ at the critical points $\frac{1}{2}$

$\therefore -e^x + (2-x)e^x = 0$

$\therefore -1 + 2 - x = 0 \quad \therefore x = 1$ $\frac{1}{2}$

$f''(x) = -e^x - e^x + (2-x)e^x$

$= -2e^x + (2-x)e^x$ $\frac{1}{2}$

$f''(1) = -2e + e = -e = negative$ $\frac{1}{2}$

$\therefore$ There is a maximum value at $x = 1$ equals e $\frac{1}{2}$

(b)

$\because f(x) = 3x^4 - 4x^3$

$\therefore f'(x) = 12x^3 - 12x^2$ $\frac{1}{2}$

$\because f'(x) = 0$

$\therefore 12x^2(x-1) = 0$

$\therefore x = 0 \in [-1, 2]$ or $x = 1 \in [-1, 2]$ $\frac{1}{2}$

$f(0) = 3 \times 0^4 - 4 \times 0^3 = 0$

$f(1) = 3 \times 1^4 - 4 \times 1^3 = -1$

$f(-1) = 3(-1)^4 - 4(-1)^3 = 7$

$f(2) = 3(2)^4 - 4(2)^3 = 16$

1

The minimum value is -1 , the maximum value is 16

$\frac{1}{2}$ $\frac{1}{2}$

13-

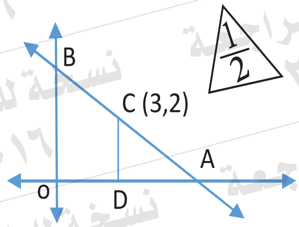
(a) $x + \frac{1}{2} sin\ 2x + c$ $\quad 1$

14-

Let , OA $= x$ and $OB = y$

$\therefore AD = x - 3$

From the similarity of the two triangles DAC and OAB we found that $\frac{x-3}{x} = \frac{2}{y}$ $\quad \frac{1}{2}$



$\frac{1}{2}$

$\therefore y = \dfrac{2x}{x-3}$

Area of Δ OAB $= \frac{1}{2}\, xy$ $\quad \frac{1}{2}$

$$A = \frac{1}{2} \times x \times \frac{2x}{x-3} = \frac{x^2}{x-3}$$

$\frac{1}{2}$

$A' = \dfrac{2x(x-3) - x^2}{(x-3)^2}$

$\therefore$ at the least area $A' = 0$

$\therefore 2x^2 - 6x - x^2 = 0$ $\quad \frac{1}{2}$

$x^2 - 6x = 0$

$\therefore x = 0$ Oder $\therefore x = 6$

$\therefore$ the area is minimum at $x = 6$

$\therefore$ the smallest area $= \frac{6^2}{6-3} = 12$ area unit $\quad \frac{1}{2}$

15-

(a) 4 1

16-

The Points of intersection

$x^2 = 5x$

$x^2 - 5x = 0$

$\therefore\ x = 0 \quad \text{or } x = 5$ $\frac{1}{2}$

$A = \int_0^5 |x^2 - 5x|\,dx$ $\frac{1}{2}$

$= \left|\frac{x^3}{3} - \frac{5x^2}{5}\right|_0^5$ $\frac{1}{2}$

$= \left|\frac{125}{3} - \frac{125}{2}\right| = \left|\frac{-125}{6}\right| =$ $\frac{1}{2}$

$\therefore \text{Area} = \frac{125}{6}$ area unit

17-

The Points of intersection $\frac{1}{2}$

$x^2 = 3x$

$x^2 - 3x = 0$ $\frac{1}{2}$

$x = 0\ ,\ x = 3$

$v = \pi \int_0^3 |x^4 - 9x^2|\ dx$ $\frac{1}{2}$

$= \pi \left| \frac{x^5}{5} - 3x^3 \right|_0^3$ $\frac{1}{2}$

$= \pi \times \left| \frac{3^5}{5} - 3 \times 3^3 \right|$ $\frac{1}{2}$

$\frac{162}{5}\pi$ Volume Unit $\frac{1}{2}$

18-

(a) $\int \frac{x+1-1}{x+1}\, dx$ $\frac{1}{2}$

$= \int \left(1 - \frac{1}{x+1}\right) dx$ $\frac{1}{2}$

$= x - \ln|x+1| + c$ 1

(b) $\int x^2 \ln x\, dx$

$= \frac{1}{3} x^3 \ln x - \frac{1}{3} \int x^2 dx$ 1

$= \frac{1}{3} x^3 \ln x - \frac{1}{9} x^3 + c$ 1

(انتهت الإجابة وتراعى الحلول الأخرى)